

REMARKS

Claims 1-20 are pending herein.

I. The Claim Rejections Under 35 U.S.C. §103(a).

a. The claim 1 "larger" quantity of ultraviolet rays emitted from the downstream member in comparison to the upstream members.

The USPTO respectfully rejects Claims 1-20 under 35 U.S.C. § 103(a) as being obvious over the combination of Young (U.S. Patent No. 6,561,640) and Mitani (U.S. Patent No. 5,666,140). Claim 1 claims the following:

*(***Please see Figure 2A and please also note the emphasis added herein for ease of understanding and the references numbers added herein only for understanding).*

1. An ink jet printer comprising:
a line print type recording heads, respectively extending in a width direction of a recording medium, for jetting ink, which is to be cured by being irradiated with an ultraviolet ray, to the recording medium; and
a plurality of ultraviolet ray irradiating devices, having a plurality of ultraviolet ray sources, for irradiating the ink jetted by the recording heads with a plurality of ultraviolet rays, after arriving of the ink at the recording medium, to cure the ink,
wherein the ultraviolet ray irradiating devices are arranged on a downstream side of the recording heads in a feeding direction of the recording medium, and *wherein a quantity of the ultraviolet rays emitted from the ultraviolet ray source or the ultraviolet ray sources (12) of the ultraviolet ray irradiating device, which is arranged on the most downstream side (12) in the feeding direction of the recording medium, is set to be larger than that of the ultraviolet rays emitted from the ultraviolet ray source or the ultraviolet ray sources of the other ultraviolet ray irradiating device or each of the other ultraviolet ray irradiating devices (10).*

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In regard to claim 1, as best seen in Fig. 2A, the most downstream (see x arrow) ultraviolet rays sources 11 are larger in quantity at most downstream member 12 than at more upstream members 10.

This larger quantity of "most downstream" ultraviolet ray sources (11,12) fully cures the inside of the ink that may, in an embodiment, have only been cured (by design) on the surface (only the surface of the ink was cured by more upstream sources 10). This embodiment is quickly described at page 18 of the specification attached hereto for the convenience of the Examiner. The Examiner is encouraged to quickly read page 18 attached for background as well for ease of understanding.

Note: Independent Claims 8, and 15 claim variations of this concept wherein claim 8 claims a "higher" intensity of the ultraviolet rays in the most downstream member 12, and claim 15 claims a "longer" wavelength emitted from the most downstream member 12.

b. Young does not teach or suggest the "larger quantity", "higher intensity", or "longer wavelength" of ultraviolet rays emitted the most downstream member in comparison to the upstream members for curing the ink of claims 1, 8, or 15 respectively.

Referring to Applicant's Claims 1, 8, and 15, the USPTO respectfully cites Young at Column 4, Lines 50-60, which states:

"Employing this laser beam/light emitting diode curing technique makes it possible to achieve small form factor, lower power consumption and, potentially, equipment portability. In particular, the technique can be suitable for curing ultraviolet resin ink on paper or on an intermediate transfuse or transfer belt or roller. Properly selecting the one or more operating wavelengths of the one or more light emitting devices will control the effectiveness of the exposure in curing the substance according to the substance's photo response."

However, Young is a very general and non-detailed patent. While Young does generally disclose a technique in which ultraviolet rays may include one or more operating wavelengths

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to control effectiveness of the exposure in curing, Young does not disclose the specifically claimed techniques in which the quantity or intensity or wavelength of ultraviolet rays emitted from the ultraviolet ray irradiating device or devices arranged on the most downstream side is set to be "larger," "higher" or "or longer" than the quantity/intensity/wavelength of ultraviolet rays emitted each of the other more upstream ultraviolet ray irradiating device or devices.

Applicants also point the Examiner to Young's Figure 7 and Col. 10 lines 59- to Col. 11 lines 1-33. From Figure 7, it can be seen that second stage curing device 450 is not made any "larger," "higher," or "longer" quantity/intensity/wavelength than upstream curing devices 420 and the differences in specific operation between upstream and downstream curing is not specifically discussed. In short, Young teaches some general curing ideas, including curing the ink in two steps or twice, but does not teach or suggest the specifically claimed limitations of the present claims. The present limitations are important because they help improve printed output and reduce device size.

Again, Young, does not disclose a "most downstream" ultraviolet ray irradiating device or devices (or any other specific device or devices) that is specifically set to emit ultraviolet rays of "larger," "higher," or "longer" quantity/intensity/wavelength than the ultraviolet rays of the other upstream ultraviolet ray irradiating devices as specifically claimed in claims 1, 8, or 15 respectively.

Mitani does not make up for these deficiencies and is only cited for teaching line printing.

Therefore, Applicant's Claims 1, 8, and 15 are not obvious over Young in view of Mitani.

The remaining claims are dependent from the allowable claims above, and are therefore also respectfully asserted to be allowable.

II. Additional points.

Young discloses a technique in which ultraviolet ray irradiating is performed to an ink jetted on a recording medium twice to cure the ink. However, Young does not disclose the technique in which the quantity of ultraviolet rays for the second time emission of ultraviolet ray is larger than that of the first time emission of ultraviolet rays.

Further, Young does not disclose the technique in which an ink is further jetted onto another ink which was already jetted on the recording medium. That is, Young does not disclose the technique in which a first ink is jetted on the recording medium and is thereafter cured, and further a second ink is jetted on the cured first ink and is thereafter further cured.

As shown in figures 2A and 2B, an ultraviolet ray irradiating device 10 on a downstream side of each of the line print type recording heads 8 of black (K), cyan (C), magenta (M) and yellow (Y), respectively is provided with the ultraviolet ray sources 11 and 12.

In the ink jet printer, first, the black ink (K) is jetted from the recording head 8 of black (K) on the recording medium P and the surface of the ink (K) is cured by the adjacent downstream ultraviolet ray sources 11; and then the cyan ink (C) is jetted thereon from the recording head 8 of cyan (C) and the surface of the ink (C) is cured by the adjacent downstream ultraviolet ray sources 11. Then, the magenta ink (M) is jetted thereon from the recording head 8 of magenta (M) and the surface of the ink (M) is similarly cured by the adjacent downstream ultraviolet ray sources 11; and after the yellow ink (Y) is jetted thereon from the recording head 8 of yellow (Y), finally, the most downstream ultraviolet ray irradiating device 10 irradiates not only the yellow ink (Y) but also previously jetted inks (K), (C) and (M), to almost perfectly cure the all types of ink. The larger irradiation quantity (or higher intensity, or a lot of longer wavelength components included) of ultraviolet rays emitted from the ultraviolet ray source of the irradiating device arranged on the most downstream side, than that of the ultraviolet rays emitted from each of the other ultraviolet ray irradiating device, is effective at curing and fixing the all jetted inks completely.

Thus, the ultraviolet ray irradiation in the upstream side is required only to cure the surface of the jetted ink, in order to enable jetting next ink, and the ultraviolet ray irradiation in the most downstream side takes charge of curing and fixing the all jetted inks completely.

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Consequently, the ink jet printer can be simplified and miniaturized.

As described above, Young does not disclose nor suggest the subject matter of the claims at all. Therefore, the subject matter of the claims is not obvious to a person having ordinary skill over Young in view of Mitani.

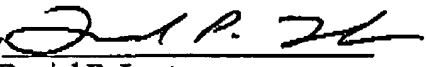
III. Conclusion.

Reconsideration and allowance of all of the claims is respectfully requested.

If there are any additional charges with respect to this Request for Reconsideration or otherwise, please charge them to Deposit Account No. 06-1130.

Please contact the undersigned for any reason. Applicants seek to cooperate with the Examiner including via telephone if convenient for the Examiner.

Respectfully submitted,

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11 of the other ultraviolet ray irradiating devices 10. In this case, the ink can be reliably and almost perfectly cured by the ultraviolet ray irradiating device 10 arranged on the most downstream side.

Each of the ultraviolet ray irradiating devices 10 arranged adjacent to the recording heads 8 corresponding to yellow (Y), magenta (M), cyan (C) and black (Bk) is provided with the ultraviolet ray sources 11 which emit a quantity of ultraviolet rays sufficient to cure only the surface of the ink. As shown in FIGS. 2A and 2B, the ultraviolet ray irradiating device 10 arranged on the most downstream in the feeding direction X of the recording medium P and adjacent to the recording head 8 of yellow (Y) has a width in the feeding direction X of the recording medium P larger than those of the other ultraviolet ray irradiating devices 10 and is provided with the ultraviolet ray sources 11, of which the number is larger than that in each of the other ultraviolet ray irradiating devices 10 to emit ultraviolet rays having a quantity sufficient to reach the inside of the ultraviolet ray curable ink and to almost perfectly cure the ink.

The quantity of the ultraviolet rays denotes the energy of the ultraviolet rays and is determined as a product of the intensity of the ultraviolet rays and the irradiation time of the ultraviolet rays. Therefore, for example, even though each ultraviolet ray source 11 emits

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